

Appendix A
Environmental Consulting Services Report

Environmental Consulting
Jerry Lipp
2 Village Loop
Kalispell, MT 59901
(406) 257-0679

INFORMATION SHEET FOR SUBDIVISION NO. 292
July 22, 2015

This proposal consists of four undeveloped parcels. A series of four test holes were dug on the project. The field logs of the holes have been enclosed.

Based on the attached well logs, a K value can be calculated as follows: (see attached sheet).

Based on the enclosed calculations, the project is non-significant.

The stormwater calculations have been broken down into two groups, the runoff generated by the road and runoff generated by the building sites.

For every linear foot of road (see road section) we will have at least 5.56 cubic feet of stormwater retention for a total of 4689 cubic feet. To retain the water in the ditches, we will require 995 cubic feet of storage. As you can see, we have over 4.5 times the minimum amount. The building sites will each have a small retention basin that will easily contain the additional runoff. Each basin as well as the road ditches will be maintained by the homeowner's association.

The road surface and building size basin sites have been included on the lot layout.

If there are further questions or concerns, please contact my office at your earliest convenience.

Sincerely,

Jerry Lipp

Enc.

JUL - 8 2016
406 257 0679

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
LOCAL GOVERNMENT JOINT APPLICATION FORM

No. _____

PART I. GENERAL DESCRIPTION AND INFORMATION (Please type or print all information)

1. Name of proposed development SUB NO. 292

2. Location (City and/or County) FLATHEAD CO

Legal description: NE 1/4 NW 1/4 Section 20 Township 29 Range 21

3. Is concurrent review by the local governing body and DEQ requested?
Yes _____ No _____

4. Type of Water Supply system:
☒ Individual or shared well
☐ Individual cistern
☐ Individual surface water supply or spring
☐ Multiple family water supply system (3-14 connections and fewer than 25 people)
☐ Service connection to multiple-family system
☐ Service connection to public system
☐ Extension of public main
☐ New public system

5. Type of wastewater treatment system:
☒ Individual or shared on-site septic system
☐ Multiple family on-site system (3-14 connections and fewer than 25 people)
☐ Service connection to multiple family system.
☐ Service connection to public system.
☐ Extension of public main
☐ New public system.

6. Name of solid waste (garbage) disposal site FLATHEAD CO LANDFILL

7. Is information included which substantiates that there will be no degradation of state waters or that degradation will be non-significant? Yes

If not, have you enclosed an Application to Degrade? _____

8. Descriptive Data:

a. Number of lots or rental spaces 4
b. Total acreage in lots being reviewed 4.291
c. Total acreage in streets or roads 1.098
d. Total acreage in parks, open space, and/or common facilities 0
e. TOTAL gross acreage of subdivision 5.389
f. Minimum size of lots or spaces 1.252
g. Maximum size of lots or spaces 1.459

9. Indicate the proposed use(s) and number of lots or spaces in each:

- 4 Residential, single family
- _____ Residential, multiple family
- _____ Types of multiple family structures and numbers of each (e.g.: duplex, 4-plex)
- _____ Planned Unit Development (No. of Units _____)
- _____ Condominiums (No. of Units _____)
- _____ Mobile Home Park
- _____ Recreational Vehicle Park
- _____ Commercial or Industrial
- _____ Other (please describe)

10. Provide the following information regarding the development:

- a. Current land use pasture
- b. Existing zoning or other regulations See Attached
- c. Depth to groundwater at the time of year when water table is nearest to the natural ground surface within the drainfield area > 8'
- d. Depth to bedrock or other impervious material in the drainfield area > 8'
- e. An overall development plan indicating the intent for the development of the remainder of the tract, if a tract of land is to be subdivided in phases.
- f. Drafts of any covenants and restrictions to be included in deeds or contracts for sale.
- g. Drafts of homeowners' association's by-laws and articles of incorporation, if applicable. (Submitting a draft copy of a homeowners' association bylaws and articles of incorporation is adequate for DEQ to initiate and complete its review of sanitary facilities, but a copy of the fully executed documents must be submitted before DEQ can issue final approval.)

I understand that:

A person may not file a subdivision plat with a county clerk and recorder, make disposition of any lot [sell, rent, lease, or otherwise convey title to or possession of a lot], erect any facility for the supply of water or disposal of sewage or solid waste, or occupy a permanent building in a subdivision until the reviewing authority has indicated that the subdivision is subject to no sanitary restrictions (76-4-123, MCA) [Parenthetical text added for clarification].

I designate JERRY LEPP as my representative for purposes of this application.

Name, address and telephone number of designated representative, (e.g. engineer, surveyor).

Name JERRY LEPP Phone 257-0679
Address 2 Village Loop City CAL State MT Zip Code 59901

Signature of Owner A

Print Name of Owner _____

Title, if corporate officer _____

Address _____ City _____ State _____ Zip Code _____

Date _____ Phone _____

(The statement must be signed by the owner of the land proposed for subdivision or the responsible officer of the corporation offering the same for sale.)

Part IV SUBDIVISION CHECKLIST

Subdivision:

E.Q. Number (provided by DEQ):

County:

Date:

Please complete the checklist with your initials or N/A.

Applicant or Representative Initial or N/A	County Initial or N/A	DEQ Initial or N/A	Question	Refer to ARM 17.36 Subsections	Reviewer's Comments
			1. Have deviation or waiver requests been submitted with appropriate fees?	17.36.601	
			2. Is check included with correct fee?	17.36.103(1)(a)	
			3. Is application included with owner's signature/address/phone/date?	17.36.102(1)&(2)	
			4. Is legible copy of Preliminary Plat or COS included?	17.36.103(1)(n)	
			5. Is legal description included on the Preliminary Plat or COS?	17.36.103(1)(n)	
			6. Are all lots described on survey being reviewed and any exclusions clearly stated on Preliminary Plat or COS?	17.36.103(1)(n), 17.36.605	
			7. Are state letters of approval included (DNRC, Groundwater discharge permit, public water, etc.)?	17.36.103	
			8. Is local health officer approval included?	17.36.102(3)&(6), 17.36.108(2)	
			9. Are Planning Board or County Commissioner comments included?	17.36.103(1)(o)	
			10. Is a clear copy of USGS or other topo map included to show ground slope of property?	17.36.103(1)(h), (SWTS) 17.36.310 (SW), 17.36.322 (SWTS siting)	
			11. Are 4 copies of lot layout included with the subdivision name on each?	17.36.103(1)(d), 17.36.104	
			12. Is all required information (e.g., scale, legend, north arrow, etc.) included on the lot layout?	17.36.103(1)(d), 17.36.104	
			13. Are locations of water and sewer mains shown?	17.36.103(1)(d), 17.36.104	
			14. Are on-site sewer systems designed in conformance with DEQ 4?	17.36.320	
			15. Is the slope given for drainfield areas?	17.36.103(1)(h), 17.36.322	
			16. Are drainfields orientated along land contours to meet depth requirements?	17.36.322, DEQ 4, Chap. 8	
			17. Are drainfield replacement areas shown?	17.36.104(2), Table 1	
			18. Are minimum setback requirements met?	17.36.323	
			19. Is adequate test pit (8 ft. excavation) data provided?	17.36.103(1)(h), 17.36.325	
			20. Is SCS/NRCS soils data provided?	17.36.325(3)	
			21. Is information to verify depth to seasonal high ground water or bedrock provided?	17.36.103(1)(h), 17.36.106(2), 17.36.325(2)	
			22. If conducted, does perc test value(s) correspond to soil type?	17.36.103(1)(h)	
			23. Are wells, 100 ft. well isolation zone, mixing zones, and ground water flow direction (verified by wells or other documentation) shown?	17.36.103(1)(e), 17.30.501-518	
			24. Is adequate water supply substantiated?	17.36.103(1)(f), 17.36.330	

Applicant or Representative Initial or N/A	County Initial or N/A	DEQ Initial or N/A	Question	Refer to ARM 17.36 Subsections	Reviewer's Comments
			25. Are water quality analyses (nitrate, specific conductivity, and bac-T (for existing wells) provided, along with well log and well location?	17.36.103(1)(f), 17.36.330, 17.36.335	
			26. Is existing well over 25 ft. in depth?	17.36.335, 17.36.331(1)(e)	
			27. Will surface water, spring or cistern system be disinfected and filtered?	17.36.336	
			28. Is nondegradation addressed and supporting data to determine background water quality, hydraulic conductivity and hydraulic gradient provided?	17.36.103(1)(j), 17.30.501-518, 17.30.715	
			29. Is nitrate level at end of mixing zone < 5 ppm (< 7.5 ppm, if level 2 provided), and phosphorous breakthrough > 50 years and trigger analysis for n and p addressed?	17.36.103(1)(j), 17.30.715	
			30. Are shared users agreements included for shared well, drainfields and/or easements?	17.36.103(1)(p), 17.36.326(3)	
			31. Is a copy of the local septic permit (if issued) for an existing septic system provided?	17.36.327	
			32. Is a septic pumper's report stating an existing septic tank has been pumped within the last 3 years provided?	17.36.327	
			33. Is evidence demonstrating proper hydraulic functioning of an existing septic system provided?	17.36.327	
			34. Are wells, drainfields and/or mixing zones within 100 ft. perimeter outside of subdivision boundaries shown?	17.36.103(1)(e), 17.30.501-518, 17.30.706	
			35. Is proposed subdivision within 500 feet of public water supply and/or sewer system?	17.36.328(1)	
			36. Is authorized statement to connect to existing public water and/or sewer system and statement of adequate capacity provided?	17.36.103(1)(g), 17.36.328(2)(b)	
			37. Is existing public water system approved by DEQ and PWS # provided?	17.36.328(2)(b) & (c)	
			38. Do appropriate water rights exist for the public water connection?	17.36.328(2)(b)	
			39. If needed, are easements for water and/or sewer systems/lines shown?	17.36.103(1)(n) & (p)	
			40. Are plans and specs (3 copies) stamped and signed by PE?	17.36.103 (1)(b) & (c)	
			41. Is letter from owner stating "as-builts" will be submitted included?	17.36.314	
			42. Are 100-year floodplain requirements met, and floodplains and drainages shown?	17.36.104, 17.36.106(2)(c), 17.36.324	
			43. Is solid waste disposal addressed?	17.36.103(1)(l), 17.36.309 (waste stored on-site)	
			44. Has storm water drainage been addressed?	17.36.103(j), 17.36.104(2), 17.36.310, DEQ 8	

Notes:

Applicant/representative: Name _____ Signature _____ Date / /

County reviewer: Name _____ Signature _____ Date / /

DEQ reviewer: Name _____ Signature _____ Date

Subdivision Review Fee Calculation Checklist

SUBDIVISION NAME: SUB NO 292 EQ#

Choose type of lots, water system, wastewater system, nondegradation, and other components as necessary

TYPE OF LOTS

	Unit	Unit cost	Number of Units	Total (unit cost x no. of units)
Subdivision lot	lot/parcel	\$125	4	500 \$0
Condo unit - Trailer court - RV campground	unit/space	\$50		\$0
Resubmittal fee - previously approved lot/boundaries not changed	lot/parcel	\$75		\$0

TYPE OF WATER SYSTEM

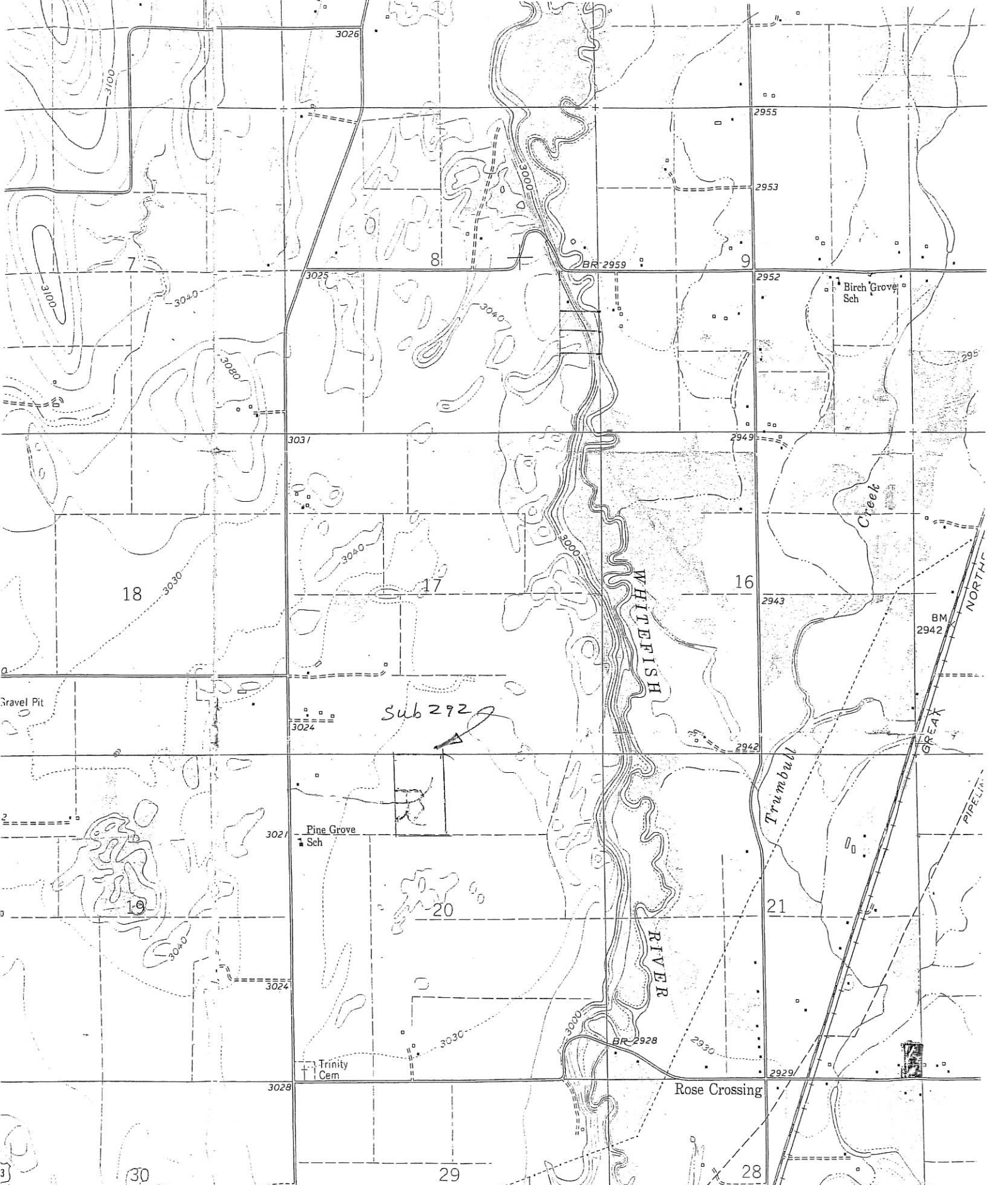
Cisterns	unit	\$85		\$0
Individual or shared water supply system (existing/proposed)	unit	\$85	4	340 \$0
Multiple user water system (non-public)	unit*	\$315		\$0
*plus \$105 per hour for review in excess of 4 hours	hour	\$105	If Required	To be invoiced
extension of existing system	lineal foot	\$0.50		\$0
connection to approved existing distribution system	lot/unit	\$70		\$0
Public water system				
DEQ 1 or DEQ 3 Water System	component		per 17.38.106	To be invoiced
new distribution system	lineal foot	\$0.50		\$0
connection to distribution system	lot/structure	\$70		\$0

TYPE OF WASTEWATER SYSTEM

Existing systems	unit	\$75		\$0
New gravity subsurface system	drainfield	\$95	4	380 \$0
New pressure-dosed, elevated sand mound, ET system,	design*	\$190		\$0
intermittent sand filter, ETA system, recirculating sand filter,	drainfield	\$50		\$0
recirculating trickling filter, aerobic treatment unit,				
nutrient removal, and subsurface drip				
*plus \$105 per hour for review in excess of 2 hours	hour	\$105	If Required	To be invoiced
New multiple user wastewater system (non-public)	unit*		Per Type Above	
*plus \$105 per hour for review in excess of 4 hours	hour	\$105	If Required	To be invoiced
new collection system	lineal foot	\$0.50		\$0
connection to new multi-user system	lot/unit	\$70		\$0
Public wastewater system				
DEQ 2 or DEQ 4 Treatment System	component		per 17.38.106	To be invoiced
new collection system	lineal foot	\$0.50		\$0
connection to existing system	lot/structure	\$70		\$0

OTHER

Deviation from Circular	request*	\$200		\$0
*plus \$105 per hour for review in excess of two hours	hour	\$105	If Required	To be invoiced
Waiver from Rules	request*	\$200		\$0
*plus \$105 per hour for review in excess of two hours	hour	\$105	If Required	To be invoiced
Reissuance of original approval statement	request	\$60		\$0
Nondegradation review - nonsignificance determinations				
individual/shared	drainfield	\$60	4	240 \$0
multiple-user	lot/structure	\$30		\$0
public	drainfield		per 17.38.106	To be invoiced
Storm drainage plan review - plan exempt from DEQ-8	lot	\$40	4	160 \$0
Storm drainage plan review - DEQ-8 review	design*	\$180		\$0
	lot	\$40		\$0
*plus \$105 per hour for review in excess of 30 minutes per lot	hour	\$105	If Required	To be invoiced
Preparation of environmental impact statements/EAS		actual	If Required	To be invoiced
Gray water reuse systems. This is a stand-alone fee and all gray water reuse systems will be reviewed at the unit cost				
	unit*	\$95		\$0
*plus \$105 per hour in excess of two hours	hour	\$105	If Required	To be invoiced
Total Review Fee				1620 \$0



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TEST HOLE LOG SHEET

For RIG

Lot or Tract No. _____

Date 7-9-15

Test Hole No. 2

Depth In.	Color	Texture	Coarse Fragment		Structure	Comments
			%	Size		
0-10"	DK Brown	FSL	0		WF GV	
10'-21"	Light Orange	FSL	0		WF ABK	
21'-130"	LT Brown	FSL	0		WF SBK	NO SEPS OR AND W/C

Lot or Tract No. _____

Test Hole No. 1

Depth In.	Color	Texture	Coarse Fragment		Structure	Comments
			%	Size		
0-12	DK Brown	FSL	0		GV	
12-21	Orange	FSL	0		WF SBK	
21-88	Brown	FSL	0		SGM	
88-110	LT Brown	L to SL	0		WF ABK	

110 + LT Brown

C - Clay
SIC - Silty Clay
SC - Sandy Clay
CL - Clay Loam
SICL - Silty Clay Loam
SL - Sandy Loam
LS - Loamy Sand
S - Sand
L - Loam
SIL - Silt Loam
SI - Silt
LT - Light

Legend

PL - Platty
PR - Prismatic
ABK - Angular Blocky
SBK - Subangular Blocky
GR - Granular
SGM - Single Grained/Massive
W - Weak
S - Strong
F - Fine
VF - Very Fine
CO - Coarse
DK - Dark

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TEST HOLE LOG SHEET

For R2G-6

Lot or Tract No. _____

Date 7-9-15

Test Hole No. #3

Depth In.	Color	Texture	Coarse Fragment		Structure	Comments
			%	Size		
0-20	DK Brown	FSL	0		GV	
20-36	DK Orange	FSL	0		VF ABK	
36-110	LT Brown	to VFSL	0		VF ABK	no clay BR.

Lot or Tract No. _____

Test Hole No. #4

Depth In.	Color	Texture	Coarse Fragment		Structure	Comments
			%	Size		
0-10	DK Brown	FSL	0		GL	
10"-18	LT Orange	FSL	0		VF SBK	
18-110	LT Brownish Orange	L + S SIL	0		SF ABK	no clay BR.

C - Clay
SIC - Silty Clay
SC - Sandy Clay
CL - Clay Loam
SICL - Silty Clay Loam
SL - Sandy Loam
LS - Loamy Sand
S - Sand
L - Loam
SIL - Silt Loam
SI - Silt
LT - Light

Legend

PL - Platty
PR - Prismatic
ABK - Angular Blocky
SBK - Subangular Blocky
GR - Granular
SGM - Single Grained/Massive
W - Weak
S - Strong
F - Fine
VF - Very Fine
CO - Coarse
DK - Dark

JUL 8 2015

AUG 31 2015

GROUNDWATER MONITORING

RECEIVED

APR 23 2009

COMPLETED ☒ 7-27-14

Monitoring results from 2009

TEST HOLE SIX IS LOCATED 600' TO THE NORTH WEST IN A LOW AREA.

YEAR _____

ZONE _____

SUBMITTAL _____

GWM _____

APPL _____

(MUST HAVE LAYOUT MAP & DIRECTIONS)

HEALTH DEPARTMENT

Owner: FRONTIER Development Co Mailing Address: 1765 Hwy 93 WestProperty Address: Whitefish stage Phone 862 8393Contact if not owner: Jerry Lipp Address: 2 Village Loop Phone 257-0679Legal Description: _____
Subdivision name: _____ Lot _____ Block _____or Assessor Tract #: 25,6,7 Section 20 Twn 29 Rng 21

DATE	SITE # 6			SITE # 7			SITE # 8			SITE # 9			SITE # 10		
MM/DD/YY	A	B	A-B	A	B	A-B	A	B	A-B	A	B	A-B	A	B	A-B
4-23-09	116	22	94 wet	119	24	95 dry	119	23	96 dry	117	21	96 dry	120	24	96
4-30-09	116	22	94	119	24	95	119	23	96	117	21	96	120	24	96
5-8-09	117	22	95	119	24	95	119	23	96	117	21	96	120	24	96
5-18-09	117	22	95	119	24	95	119	23	96	117	21	96	120	24	96
5-28-09	117	22	95 mud	119	24	95	119	23	96	117	21	96	120	24	96
6-10-09	117	22	95 mud	119	24	95	119	23	96	117	21	96	120	24	96
6-18-09	118	22	96 dry	119	24	95	119	23	96	117	21	96	120	24	96

SEE REVERSE FOR MONITORING PIPE INSTALLATION AND MONITORING INSTRUCTIONS

Monitoring for this parcel shall be conducted from _____ through _____.

The following monitoring schedule will be required: Preferably once each week, but no less often than once every 10 days. Less frequent monitoring may void monitoring conducted and result in monitoring the site through the next groundwater monitoring season.

I hereby certify that the above monitoring measurements and information are true, complete and correct to the best of my knowledge.

Owner or Representative signature _____

Date _____

2 JUL 7 8 2016

AUG 31 2015

R. 22 W. | R. 21 W.

(Joins sheet 13)

(Joins sheet 78)

(Joins sheet 21)

MT-70
Rev. 7-10-67

TABLE 1. ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES OF SOILS. Table 1. SOIL SURVEY AREA, MONTANA

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES OF SOILS																	
SOIL SERIES and Map Symbols	Depth to:		Depth from Surface (Inches)	Classification			Percentage passing sieve				Permeability (Inches per hour)	Available Water Capacity (Inches per inch of soil)	Reaction (pH)	Salinity (mmhos/cm)	Shrink-swell Potential	Frost Action Potential	Corrosivity (Unarmored Steel, Concrete)
	Bedrock, gravel, etc. (Inches)	Separate Table (Feet)		USDA Texture	Unified	AAASHO	Percentage larger than										
							No. 4	No. 10	No. 40	No. 200							
Alluvial land (Aa, Ab)	40 to 60 (Ab unit)	0 to 4	0 to 20 Stratified loam and silt loam 20 to 40 Loamy or sandy	NL or SM	A-1 or A-2	0 to 1	75-100	95-100	60-90	50-75	.63-2.0	.12-.16	7.5-8.5	2-4	Low	High	Low
Beka (Ba, Bb)	20 to 60 (gravel)	3 to 10	0 to 17 Loamy fine sand 17 to 40 Med. & coarse sand	SM	A-2-4	0 to 1	45-100	95-100	50-75	25-50	2.0-6.3	.08-.11	7.3-8.9	2-5	Low	Moderate	Low
Birch (Bc, Bd)	10 to 20 (Bd)	4 to 10	0 to 14 Fine sandy loam or gravelly loam 14 to 40 Sand and gravel	SM	A-2-4	0 to 1	90-100	90-100	60-75	30-50	2.0-6.3	.10-.14	6.1-8.5	0-2	Low	Moderate	Low
Blanchard (Ba, Bb, Bc, Bd, Be, Bf, Bg, Bh, Bi, Bj, Bk, Bl, Bm, Bn, Bo, Bp, Bq, Br, Bs, Bt, Bu, Bv, Bw, Bx, By, Bz)	60 plus	below 10'	0 to 18 Fine sand and loamy fine sand 18 to 40 Fine sand	SM	A-2-4	0	100	100	65-85	3-10	6.3-20	.02-.07	7.1-7.8	0-2	Low	Moderate	Low
Chamokane (Ca, Cb, Cc)	36 to 60 (gravel)	3 to 10	0 to 14 Fine sandy loam 14 to 40 Loamy fine sand	SM or NL	A-2-4	0 to 1	95-100	90-100	60-80	40-60	2.0-6.3	.10-.14	7.9-8.4	2-4	Low	Moderate	Low
Corvallis (Cd)	60 plus	2 to 6	0 to 11 Silty clay loam 11 to 20 Silty loam 20 to 60 Stratified silt loam & very fine sandy loam	NL	A-6	0	100	100	95-100	80-90	.2-6.3	.14-.19	7.9-8.4	2-4	Low	High	Low
Creston (Ce, Cf, Cg, Ch)	60 plus	6 to 12	0 to 18 Silt loam 18 to 60 Silt loam & very fine sandy loam	NL	A-6	0	100	100	90-100	70-90	.63-2.0	.16-.20	7.4-7.8	2-4	Low	High	Low
Demers (Da, Db, Dc)	60 plus	6 to 10	0 to 7 Silt loam 7 to 14 Silty clay loam 14 to 60 Stratified silt and fine sand	NL or CL	A-4 or A-6	0	100	100	95-100	85-95	.06-.20	.08-.10	7.0-8.5	4-5	Moderate	High	Moderate
Dumas (Dd, De, Df)	60 plus	3 to 8	0 to 20 Silty clay or silty clay loam 20 to 60 Silty clay loam	NL or CL	A-4 or A-6	0	100	100	95-100	90-95	.06-.20	.13-.16	6.1-7.3	2-4	Low	High	Moderate
Flathead (Fa, Fb, Fc, Fd, Fe, Ff, Fg, Fh)	60 plus	below 10'	0 to 24 Very fine or fine sandy loam 24 to 44 Fine sandy loam or loamy fine sand 44 to 60 Loamy fine sand	NL	A-4	0	100	100	70-95	55-70	2.0-6.3	.13-.19	6.6-7.3	0-2	Low	High	Low
Half Moon (Ha, Hb, Hc, Hd, He, Hf, Hg, Hh)	60 plus	below 8'	0 to 7 Silt loam and very fine sandy loam 7 to 22 Silty clay loam 22 to 60 Silt loam and very fine sandy loam	NL or CL	A-4 or A-6	0	100	100	85-100	60-90	.20-.63	.13-.16	6.1-6.5	0-2	Low	High	Low
Haskell (Hs, Ht, Hu, Hv, Hw, Hx, Hy, Hz)	72 plus	below 10'	0 to 27 Fine sand or loamy fine sand 27 to 31 Fine sand & loam 31 to 72 Fine sand	SM	A-2 or A-4	0	100	100	65-90	20-40	2.0-6.3	.06-.17	6.1-6.5	0-2	Low	Moderate	Low
Kalispell (Ka, Kb, Kc, Kd, Ke, Kf, Kg, Kh, Ki, Kj, Kk, Kl, Km, Kn, Ko, Kp, Kq, Kr, Ks, Kt, Ku, Kv, Kw, Kx, Ky, Kz)	60 plus	below 8'	0 to 8 Loam or silt loam 8 to 30 Silt loam 30 to 60 Loam, silt loam very fine sandy loam	NL	A-4	0	100	95-100	85-100	60-90	.63-2.0	.14-.19	7.9-8.4	2-4	Low	High	Low
Kalispell, moderately deep over gravel (Ka, Kb, Kc, Kd, Ke, Kf, Kg, Kh, Ki, Kj, Kk, Kl, Km, Kn, Ko, Kp, Kq, Kr, Ks, Kt, Ku, Kv, Kw, Kx, Ky, Kz)	20 to 40 (gravel)	below 3'	0 to 8 Gravelly loam or loam 8 to 30 Gravelly sandy loam 30 to 60 Gravelly loamy sand	SH or NL	A-4	0-1	85-100	75-100	65-85	45-75	.63-2.0	.13-.17	7.9-8.4	2-4	Low	Moderate	Low
Kalispell, moderately deep over sand (Ka, Kb, Kc, Kd, Ke, Kf, Kg, Kh, Ki, Kj, Kk, Kl, Km, Kn, Ko, Kp, Kq, Kr, Ks, Kt, Ku, Kv, Kw, Kx, Ky, Kz)	20 to 40 (sand)	below 8'	0 to 8 Silt loam, loam or very fine sandy loam 8 to 30 Fine sandy loam 30 to 60 Loamy fine sand	NL-SH	A-4	0	95-100	95-100	65-85	40-55	2.0-6.3	.12-.14	7.9-8.4	0-2	Low	Moderate	Low
Kalispell, heavy subsoil (Ka)	60 plus	5 to 10	0 to 8 Silt loam 8 to 36 Silty clay loam 36 to 60 Silt and fine sand	NL	A-4	0	100	100	90-100	70-90	.20-.63	.13-.16	7.9-8.4	2-4	Low	High	Moderate
Kiviana (Kd, Ke, Kf, Kg, Kh, Ki, Kj, Kk, Kl, Km, Kn, Ko, Kp, Kq, Kr, Ks, Kt, Ku, Kv, Kw, Kx, Ky, Kz)	36 to 60 (gravel)	3 to 8	0 to 9 Loam or fine sandy loam 9 to 39 Fine sandy loam & loamy fine sand 39 to 60 Coarse sand, some gravel	NL or SM	A-4	0-1	95-100	95-100	70-95	40-70	.63-2.0	.14-.19	7.9-8.4	0-2	Low	Moderate	Low
Kraus (Ka, Kb, Kc, Kd, Ke, Kf, Kg, Kh, Ki, Kj, Kk, Kl, Km, Kn, Ko, Kp, Kq, Kr, Ks, Kt, Ku, Kv, Kw, Kx, Ky, Kz)	10 to 20 (gravel)	below 8'	0 to 12 Gravelly loam 12 to 20 Very gravelly sandy loam 20 to 60 Very gravelly & bubbly sand	GM or SH	A-4	0-5	70-80	65-75	55-70	40-50	.63-2.0	.17-.25	5.6-6.5	0-2	Low	Low	Low
Madre Land (Ma)	(Too variable to interpret)	Interpret															
McGuffery (Ma, Mb, Mc, Md, Me, Mf, Mg, Mh, Mi, Mj, Mk, Ml, Mm, Mn, Mo, Mp, Mq, Mr, Ms, Mt, Mu, Mv, Mw, Mx, My, Mz)	60 plus	below 10'	0 to 20 Loamy sand 20 to 60 Medium sand	SM	A-2-4	0	100	95-100	50-75	15-20	2.0-6.3	.06-.10	5.6-6.5	0-2	Low	Moderate	Low
Mesa (Ma, Mb, Mc, Md, Me, Mf, Mg, Mh, Mi, Mj, Mk, Ml, Mm, Mn, Mo, Mp, Mq, Mr, Ms, Mt, Mu, Mv, Mw, Mx, My, Mz)	10 to 20 (gravel)	below 12'	0 to 8 Loam or gravelly loam 8 to 14 Gravelly loam 14 to 60 Very gravelly loamy sand	NL or SM	A-4	0-2	40-95	75-85	70-100	50-80	2.0-6.3	.13-.16	6.6-7.3	0-2	Low	Moderate	Low

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME: SUBDIVISION No. 292

COUNTY:

LOT #:

NOTES:

<u>VARIABLES</u>	<u>DESCRIPTION</u>	<u>VALUE</u>	<u>UNITS</u>
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	80.0	ft
L	Length of Primary Drainfield's Long Axis	80.0	
W	Width of Primary Drainfield's Short Axis	50.0	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	6.0	ft
D	Distance from Drainfield to Surface Water	2500.0	
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	1.0	ft
Ne			
Sw	Soil Weight (usually constant)	100.0	lb/ft ³
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0	ppm
#l	Number of Single Family Homes on the Drainfield	1.0	

CONSTANTS

Pl	Phosphorous Load per Single Family Home (constant)	6.44	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	

EQUATIONS

Pt	Total Phosphorous Load = (Pl)(#l)	6.44	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	2400000.0	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	74687500.0	lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	15417.5	lbs

SOLUTION

BT	Breakthrough Time to Surface Water = P / Pt	2394.0	years
----	---	--------	-------

BY:

DATE: July 22, 2015

NOTES:

- * Depth to limiting layer is typically based on depth to water in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.
 ** Material type is usually based on test pit. A soil that contains more than 35% silt and clay sized particles is considered fine grained.

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

NITRATE SENSITIVITY ANALYSIS

Model Updated 01/24/96

SITE NAME: SUBDIVISION No. 292

COUNTY:

LOT #:

NOTES:

<u>VARIABLES</u>	<u>DESCRIPTION</u>	<u>VALUE</u>	<u>UNITS</u>
K	Hydraulic Conductivity	206.4	ft/day
I	Hydraulic Gradient	0.007	ft/ft
D	Depth of Aquifer (usually constant)	15.0	ft
L	Mixing Zone Length (see ARM 17.30.517(1)(d)(viii))	100	ft
Y	Width of Drainfield Perpendicular to Ground Water Flow	80	ft
Ng	Background Nitrate (as Nitrogen)	0.01	mg/L
Nr	Nitrate (as Nitrogen) in Precipitation (usually constant)	1.0	mg/L
Ne	Nitrates in Effluent (50 for conventional; 24 for level II)	50	mg/L
#I	Number of Single Family Homes on the Drainfield	1.0	
QI	Quantity of Effluent per Single Family Home (constant)	26.70	ft3/day
P	Precipitation	16.0	in/year
V	Percent of Precipitation Recharging Ground Water (usually constant)	0.20	

EQUATIONS

W	Width of Mixing Zone Perpendicular to Ground Water Flow = (0.175)(L)+(Y)	97.50	ft
Am	Cross Sectional Area of Aquifer Mixing Zone = (D)(W)	1462.50	ft2
As	Surface Area of Mixing Zone = (L)(W)	9750.00	ft2
Qg	Ground Water Flow Rate = (K)(I)(Am)	2113.02	ft3/day
Qr	Recharge Flow Rate = (As)(P/12/365)(V)	7.12	ft3/day
Qe	Effluent Flow Rate = (#I)(QI)	26.70	ft3/day

SOLUTION

Nt	$=((Ng)(Qg)+(Nr)(Qr)+(Ne)(Qe)) / ((Qg)+(Qr)+(Qe))$	0.64	mg/L
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BY:

DATE: July 22, 2015

G:\WPB\SUBDIV\WORKSPAC\NDEGWSA.XLS

REV. 12/98

JUL - 8 2015

AUG 27 2015

K VALUE FOR
SUB NO. 292 FT.

SCHROCK

$$T = 33.6 \left(\frac{192.5 \times 50}{44} \right)^{.67}$$

$$= (33.6)(36.9)$$

$$= 1241.9 \quad K = \frac{T}{6} = \frac{1241.9}{10} = 124.2 \text{ Ft/day}$$

GRONLEY

$$T = 33.6 \left(\frac{192.5 \times 36}{5} \right)^{.67}$$

$$(33.6)(127.3)$$

$$4278.8 \quad K = \frac{T}{6} = \frac{4278.8}{10} = 427.9 \text{ Ft/day}$$

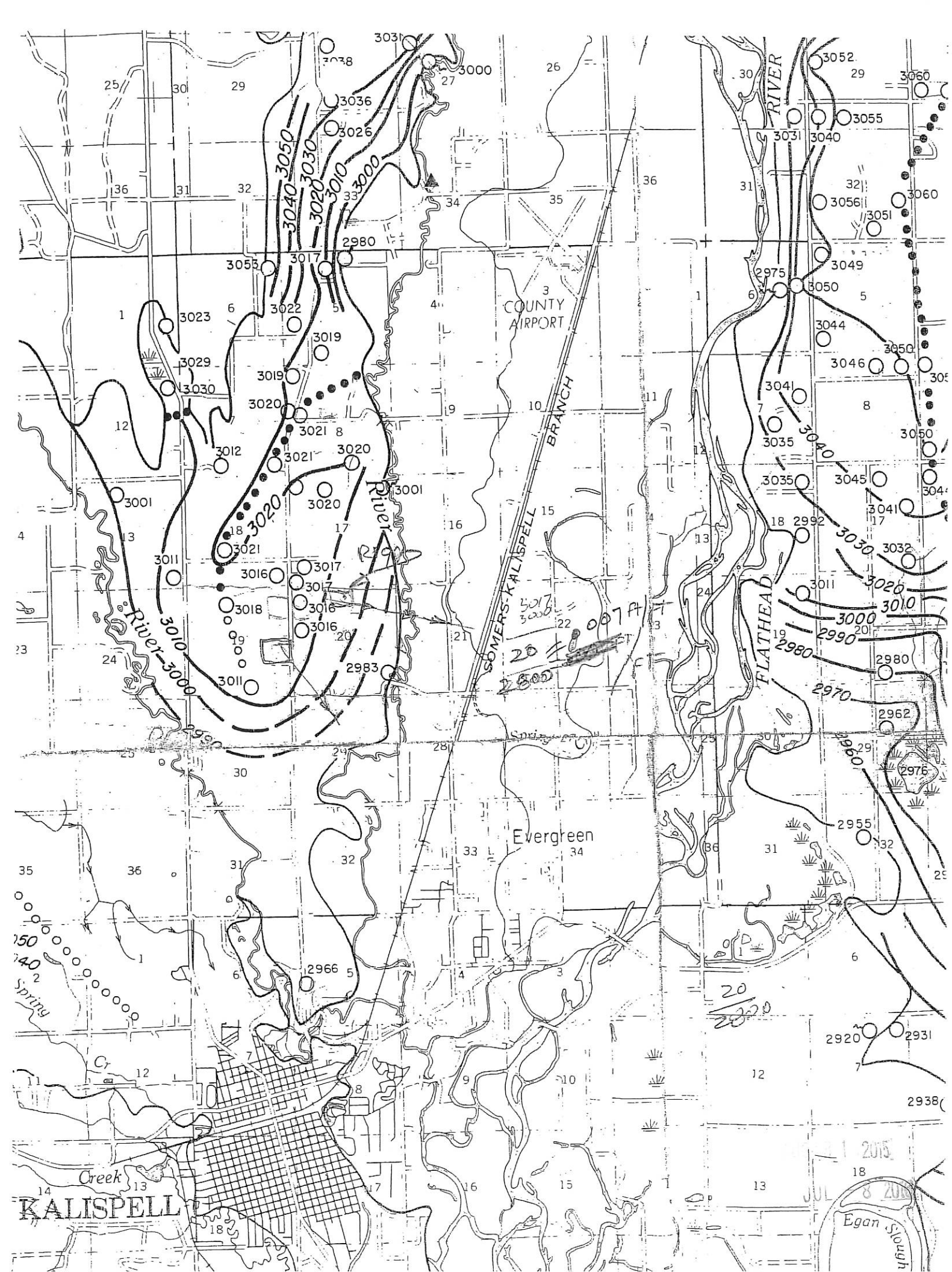
NUTTON

$$T = 33.6 \left(\frac{192.5 \times 40}{103} \right)^{.67}$$

$$= (33.6)(18.0)$$

$$= 604.9 \quad K = \frac{T}{9} = \frac{604.9}{9} = 67.2 \text{ Ft/day}$$

Average 206.4 Ft/day



Other Options

[View scanned well log \(8/5/2009 7:55:01 AM\)](#)

Date 9/7/1977
Completed:

JUL - 8 2016

MONTANA WELL LOG REPORT

Other Options

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

[Return to menu](#)
[Plot this site on a topographic map](#)
[View scanned well log \(8/5/2009 8:03:14 AM\)](#)

Site Name: GRONLEY GARNET & STAN

GWIC Id: 124773

DNRC Water Right: 78577

Section 1: Well Owner(s)

1) GRONLEY, GARNET AND STAN (MAIL)
2197 WHTFISH RD
KALISPELL MT 59901 [06/13/1991]

Section 2: Location

Township	Range	Section	Quarter Sections	Geocode
29N	21W	20	SW¼ SW¼	
County				
FLATHEAD				
Latitude	Longitude	Geomethod	Datum	
48.256674	114.30679	TRS-SEC	NAD83	
Ground Surface Altitude	Method	Datum	Date	

Addition

Block

Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: CABLE

Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, June 13, 1991

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	213	6				STEEL

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	18	BENTONITE	

Section 7: Well Test Data

Total Depth: 214

Static Water Level: 120

Water Temperature:

Bailer Test *

36 gpm with feet of drawdown after 2 hours.Time of recovery hours.Recovery water level feet.Pumping water level 125 feet.

* During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

Section 8: Remarks

Section 9: Well Log

Geologic Source

112ALVM - ALLUVIUM (PLEISTOCENE)

From	To	Description
0	12	BROWN SAND
12	16	SANDY BROWN SILTY CLAY
16	41	YELLOW BROWN SILTY CLAY
41	105	BROWN SILTY CLAY
105	125	BROWN SANDY CLAY
125	201	BROWN SILTY CLAY
201	209	BROWN SILTY CLAY & PEBBLES
209	212	SAND/ SILT/ PEA GRAVEL & WATER
212	214	HARD CLAY WITH COBBLES & PEBBLES

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:

Company: WEBER

License No: WWC-181

Date

6/13/1991

Completed:

JUL -8 2016

AUG 21 2016



ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Jerry Lipp
Environmental Consulting Services
2 Village Loop
Kalispell, MT 59901

PWS ID:
Project: Purdy

Client Sample ID: Purdy

Matrix: DRINKING WATER

Collected: 09/30/2014 14:00

Lab ID: 1409463-01

Received: 09/30/2014 14:48

<u>Analyses</u>	<u>Result</u>	<u>Units</u>	<u>RL</u>	<u>MCL</u>	<u>Method</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Analyst</u>
Conductivity	413	umhos/cm	0.1		SM2510B		10/03/2014 13:50	GDM
Nitrate	ND	mg/L	0.01	10	E353.2		10/03/2014 14:49	GDM

MCL = Maximum Contaminant Limit
RL = Reporting Limit

ND = Not Detected

MEL REVIEW: *ML*

Page 1 of 1

JUL - 8 2016

AUG 31 2015

STORMWATER CALCULATIONS FOR: SUBNO 292
Building site calculations

- (1) Calculations of area to be improved or developed.

$$\text{Parking / Road} = 2200 \quad \text{ft}^2 \text{ (see attached)}$$

$$\text{Roof Area} = 2500 \quad \text{ft}^2 \text{ (see lot layout)}$$

$$\text{Total} = 4700 \quad \text{ft}^2$$

- (2) Runoff Calculations.

$$\text{Road Surface / Roof Coefficient} = .9$$

$$\text{Unimproved Land Coefficient} = .3$$

$$\text{Additional Runoff Coefficient} = .6$$

$$(3) \quad 2 \text{ Year 24 hr storm / DEQ 8} = 1.09 \text{ in/hr}$$

$$(4700) (1.09) (.6) = \frac{3074}{12} = \underline{256} \text{ cu ft. additional runoff}$$

- (4) Retention Area Requirements.

Provide 256 cu. ft. of retention area in 1 basins 60 x 8.5 x 1.*

*Note: Basin size calculations based on "V" shaped basins.

JUL - 8 2016

AUG 31 2015

STORMWATER CALCULATIONS FOR: SUB NO 292 ROAD CALCULATIONS.

- (1) Calculations of area to be improved or developed.

$$\text{Parking / Road} = 830' \times 22' = 18260 \text{ ft}^2 \quad \text{ft}^2 \text{ (see attached)}$$

$$\text{Roof Area} = 0 \quad \text{ft}^2 \text{ (see lot layout)}$$

$$\text{Total} = 18260 \quad \text{ft}^2$$

- (2) Runoff Calculations.

$$\text{Road Surface / Roof Coefficient} = .9$$

$$\text{Unimproved Land Coefficient} = .3$$

$$\text{Additional Runoff Coefficient} = .6$$

$$(3) \quad 2 \text{ Year 1 hr. storm / DEQ 8} = \frac{4.14 \text{ in/hr}}{1.09}$$

$$(18260) (1.09) (.6) = \frac{11942}{12} = 995 \text{ cu. ft. additional runoff}$$

- (3) Retention Area Requirements.

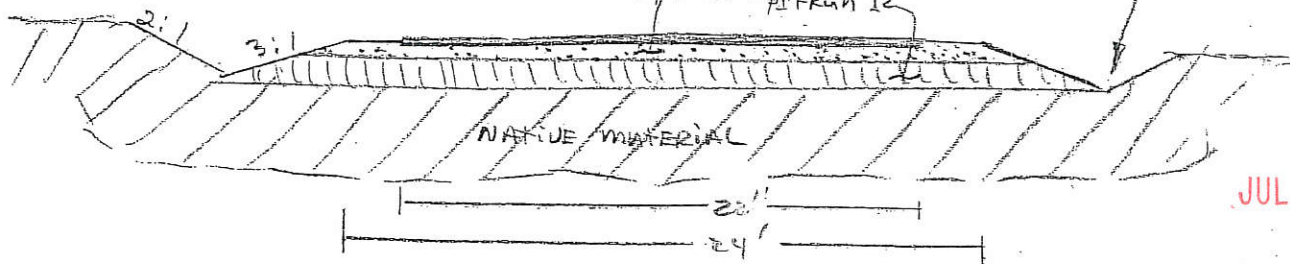
Provide 995 cu. ft. of retention area in Ditches See ROAD SECTION:
basins X X *

TOTAL AVAILABLE STORAGE @
ROAD SECTION 5.65 cu ft / LINEAR FT OF RD
= $830 \times 5.65 = 4689 \text{ cu ft TOTAL}$
DRAINAGE DITCH
& BASIN

NOTE: EACH LINEAR FOOT OF ROAD

YIELDS 5.65 cu ft of retention volume

3/4 CRUSH 6" PIT RUN 12"



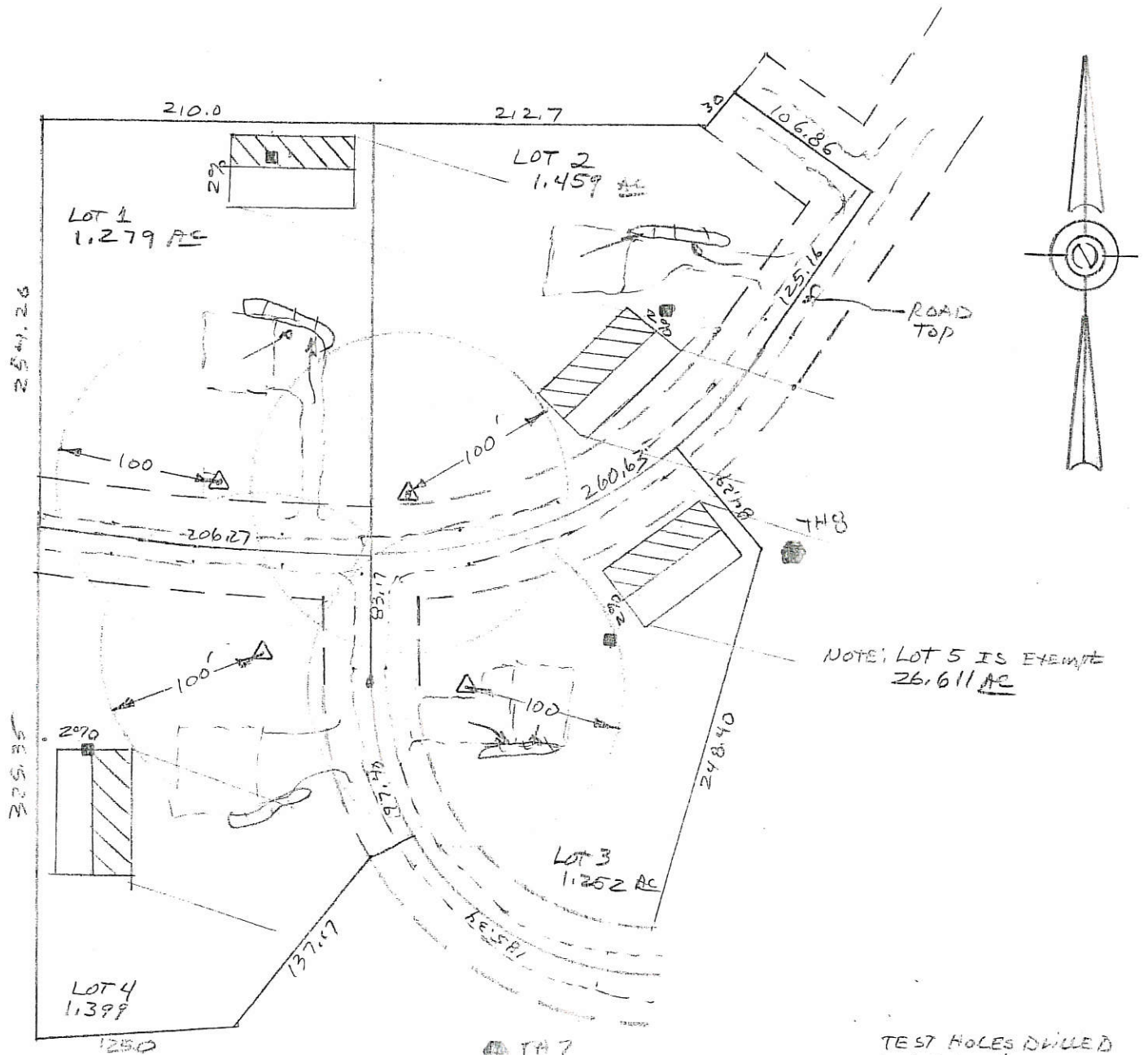
JUL - 8 2016

AUG 31 2015

SUB NO 292
NE 1/4, NW 1/4 SEC 20, T 29N, R 21W

TH 9

TH 10



LOT LAYOUT
FOR: SUB NO 292
B&I E&S
DATE: 7-22-15
SCALE: 1" = 100'

LEGEND

▨ - PROPOSED DRAINFIELD SITE

□ - 100% REPLACEMENT SITE

● - TEST HOLE

△ - PROPOSED WELL

— RETENTION BASIN

TEST HOLES DRILLED
IN & REMOVED IN
2009 HOLES WERE DRY

△ - PROPOSED WELL

● - TEST HOLE

— RETENTION BASIN
(BUILDING SITES)
60' X 8.5' X 1'

ROAD SECTION
WITH DITCHES

JUL 28 2016

AUG 31 2015